MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAM

TRIMESTER 3, 2018/2019 SESSION

TCE 2311 – DATA COMMUNICATION AND NETWORKING

(All Sections / Groups)

1st JUNE 2019
9:00 am - 11:00 am
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 4 printed pages including cover page with 5 questions only.

2. Attempt **FIVE** out of **FIVE** questions. All questions carry equal marks and the distribution of marks for each question is given.

3. Please write all your answer in the Answer Booklet provided.

Question 1 [12 marks]

(a) What is the difference between a de facto standard and a de jure standard?

[2 marks]

(b) Corresponding to each of the OSI layers in the table below, find the answers for (i) to (viii).

[8 marks]

OSI Layers	Data Encapsulation	Address Information	Protocol	Internetworking Device
Application				
Presentation				
Session	(i)			
Transport	Segment	(iv)	(vi) (vii)	
Network	(ii)	(v)	IP	Routers
Data Link	Frames	Physical Address		(viii)
Physical	(iii)			

(c) Give one example for each of the following physical addresses.

[2 marks]

i) Broadcast address
ii) Multicast address

Question 2 [12 marks]

(a) A digital signal has 16 levels and it is capable of sending 6400 bps. Show your workout for the following questions.

i) How many bits are sent per level? [2 marks]
ii) What is the bit interval? [2 marks]
iii) Calculate the baud rate. [2 marks]

(b) What is the sampling rate needed for a signal with a frequency ranged from 10,000Hz to 12,000Hz?

[1 mark]

(c) Suggest an appropriate Ethernet implementation for a Local Area Network (LAN) if the required data rate is 10Mbps, and devices are separated not more than 400m. Provide details of the suggested Ethernet implementation i.e. transmission media, maximum length and encoding scheme used.

[5 marks]

Continued .....

Question 3 [12 marks]

(a) Wireless Media *A* has high frequencies in transmissions. State one advantage and one disadvantage of using *A* as the transmission medium. [2 marks]

(b) Four channels are multiplexed into a high speed link using TDM. The transmission rate for each channel is 1000 bytes/s. 10 bytes from each channel are multiplexed to form a frame. Calculate and show your workout for

i) the size of the frame [1 mark]
ii) the bit rate for the link [1 mark]
iii) the frame rate [1 mark]
iv) the duration of a frame [1 mark]

(c) If 4 bits are allocated to be used for the sequence numbers, what is the maximum sender and receiver window sizes for the following:

i) Stop-and-Wait ARQ
ii) Go-Back-N ARQ
iii) Selective Repeat ARQ

[3 marks]

(d) A constellation diagram consists of 16 equally spaced points on a circle. If the bit rate is 6000 bps, what is the baud rate?

[3 marks]

Question 4 [12 marks]

(a) In Selective-Repeat ARQ protocol with the window size of four, calculate the worst case scenario for the time taken to send one million bits of data if each frame carries 1000 bits. The distance between the sender and receiver is 5000km and the propagation speed is $2x10^8$ m/s. Assume that the data rate is 1 Mbps and no frame is lost or damaged in the transit.

[6 marks]

(b) Compute the CRC for the message 010111001, given the divisor 1101. Show the message that will be transmitted including the CRC.

[3 marks]

(c) Describe the implementation of the controlled access method, Polling. How does a secondary device indicate that it has no data to send at a given time?

[3 marks]

Continued .....

Question 5 [12 marks]

(a) What are the two differences between a circuit switching and packet switching? Explain using their data forms and communication sharing. [4 marks]

(b) Briefly explain the three phases of communication in a virtual circuit wide area network. [3 marks]

(c) What is auto-negotiation feature in Fast Ethernet? State three purposes of auto-negotiation. [3 marks]

(d) Given an IP address, 174.24.13.5/19, find the answers for the following.

i) Class of this IP address. [1 mark]
ii) Network mask of this IP address. [1 mark]

End of Paper